Fisheries and Oceans Canada | Pêches et Océans Canada
Science | Sciences

Canadian Science Advisory Secretariat (CSAS)

Proceedings Series 2014/044

National Capital Region

Proceedings of the National Peer Review on Science Advice for Pathways of Effects for Marine Shipping

October 1-3, 2013
Ottawa, Ontario

Co-Chairpersons: Cecilia Lougheed and Mike Stoneman
Editor: Andrea White

Fisheries and Oceans Canada
200 Kent Street
Ottawa, Ontario K1A 0E6

February 2015

Canada

Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

Published by:

Fisheries and Oceans Canada
Canadian Science Advisory Secretariat
200 Kent Street
Ottawa ON K1A 0E6

http://www.dfo-mpo.gc.ca/csas-sccs/
csas-sccs@dfo-mpo.gc.ca

© Her Majesty the Queen in Right of Canada, 2015
ISSN 1701-1280

Correct citation for this publication:

DFO. 2015. Proceedings of the National Peer Review Science Advice for Pathways of Effects for Marine Shipping; October 1-3, 2013. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2014/044.

Aussi disponible en français :

MPO. 2015. Compte rendu de l'examen par les pairs concernant les avis scientifiques sur les séquences des effets du transport maritime; du 1 au 3 octobre 2013. Secr. can. de consult. sci. du MPO, Compte rendu 2014/044.

TABLE OF CONTENTS

SUMMARY iv
SOMMAIRE iv
INTRODUCTION v
PRESENTATIONS & DISCUSSIONS 1
Context for Pathways of Effects 1
Summary of the Discussion 1
Atlas of Shipping in Canada 2
Overview of the Primary Working Paper: National Shipping Pathways of Effect Models 2
Summary of the General Discussion 2
CONCLUSIONS 3
APPENDIX I. LIST OF PARTICIPANTS 4
APPENDIX II. TERMS OF REFERENCE 5

SUMMARY

Canada is committed domestically and internationally to mitigating the potential impacts of human activities on the environment. Pathways of Effects (PoE) models are an important tool to illustrate the linkages between activities and their potential impacts on various aspects of the ecosystem. In addition, PoEs are essential to the development of threat and risk assessments.

A national science advisory meeting was held October 1-3, 2013 in Ottawa to provide advice on the linkages between shipping and its potential impacts on marine and freshwater environments. Participants included experts from various sectors and Regions of Fisheries and Oceans Canada (DFO), other federal departments, environmental non-governmental organisations (ENGO), and academia.

The Science advice concerning the pathways of effects of shipping is available on the Canadian Science Advisory Secretariat website. The information issued from this science advisory process serves as a communication tool and provides general guidance to inform more detailed risk assessments.

SOMMAIRE

Le Canada s'est engagé, à l'échelle nationale et à l'échelle internationale, à atténuer les incidences potentielles des activités humaines sur l'environnement. Les modèles de séquences des effets (SE) sont un outil important permettant d'illustrer les liens entre les activités et leurs incidences potentielles sur divers aspects de l'écosystème. De plus, les séquences des effets sont essentielles à l'élaboration d'évaluations des menaces et des risques.

Une réunion de consultation scientifique nationale a eu lieu à Ottawa du 1er au 3 octobre 2013 afin de fournir un avis sur les liens entre le transport maritime et ses incidences potentielles sur les milieux d'eau douce et d'eau salée. Parmi les participants, on comptait des spécialistes de différents secteurs et régions de Pêches et Océans Canada (MPO), d'autres ministères fédéraux, des organisations non gouvernementales de l'environnement (ONGE) et des universitaires.

Les avis scientifiques concernant les séquences des effets du transport maritime peuvent être consultés sur le site Web du Secrétariat canadien de consultation scientifique. Les renseignements provenant de ce processus de consultation scientifique servent d'outils de communication et offrent une orientation générale permettant d'étayer des évaluations du risque plus détaillées.

INTRODUCTION

Co-chairs Mike Stoneman and Cecilia Lougheed welcomed participants (Appendix I) and reviewed the Terms of Reference for the meeting (Appendix II). A total of 25 participants from Fisheries and Oceans Canada (DFO), other federal departments, industry, environmental non-governmental organisations, and academia attended the meeting.

The Co-Chairs indicated that the purpose of the meeting was to review and validate the proposed pathways of effect (PoE) models, review the state of knowledge of stressor-effect relationships, and identify areas of uncertainty and knowledge gaps.

Mr. Stoneman noted that this science advisory process is just one in a series of meetings to establish PoE models which provide a basis for risk assessments related to the environmental impacts of various human activities and a communication tool for engaging stakeholders.

Sherry Walker participated as rapporteur to capture the discussions of the meeting and to provide an overview of the Canadian Scientific Advisory Secretariat (CSAS) process. Participants were requested to respect the process as described, particularly the principles around consensus.

PRESENTATIONS & DISCUSSIONS

CONTEXT FOR PATHWAYS OF EFFECTS

Martine Giangioppi gave an overview of PoE models as a tool for oceans management. She indicated that under the *Oceans Act*, the DFO Minister has the role of leading, facilitating, and coordinating oceans management within Canadian waters. DFO is in the process of developing various activity-based PoE models to address single and cumulative impacts on marine ecosystems. From a policy perspective, once PoEs are validated through a science peer review process, risk assessments can be conducted to identify issues that may require further attention. The focus of this process is on shipping, which has an important role in the Canadian economy and an understanding of the potential environmental impacts associated with this activity is needed to provide advice for future scientific and policy initiatives.

Summary of the Discussion

The discussion following Ms. Giangioppi's presentation was focused on points of clarification regarding the scope of the meeting. The Chairs confirmed that the focus of the meeting was to stay within the mandate of DFO and that the PoEs would be limited to ecological components (rather than cultural impacts, for example).

Some participants requested clarification on the level of detail that was to be produced for the PoEs and there was a wide range of opinions on what that appropriate level of detail should be. The Chairs clarified that this process was intended to develop generalized PoE models which would be very broad in nature, and to produce a common framework that could be applied in more detail to specific areas, if desired.

ATLAS OF SHIPPING IN CANADA

Yvan Simard presented his work on the Canadian Shipping Atlas which is based on the Automatic Identification System and includes all ships larger than 300 t, four different ship lengths, and five different ship speeds. The Atlas is focused on three different areas:

1. East of Québec City;
2. Québec City to the head of the Great Lakes; and
3. The waters of Canadian Pacific Ocean.

Mr. Simard indicated that the Atlas allows a user to sum ship traffic in a km^2 area for a specific period of time. This is useful information to consider in risk assessments, as well as policy development and decision-making.

OVERVIEW OF THE PRIMARY WORKING PAPER: NATIONAL SHIPPING PATHWAYS OF EFFECT MODELS

Lorne Greig provided an overview of the primary working paper that he drafted for this advisory process. He indicated that the paper was intended to be a synthesis of the available information which could be used as a communication tool and a basis for more detailed work. He noted that the paper was not intended to be a comprehensive compilation of examples for all possible endpoints, and that it was indeed challenging to determine what level of detail was appropriate. Mr. Greig also expressed that he had not attempted to prioritise the different PoEs in terms of the extent, severity, or likelihood of the potential impact(s).

Summary of the General Discussion

Many participants expressed concern that the working paper for the meeting was too focused on "newer" shipping areas (e.g. the Arctic) and was limited with respect to considering existing and expanding areas (e.g. developments off of the Grand Banks). Participants agreed that the working paper must be expanded to include more non-Arctic examples in order for it to be appropriately national in scope. Participants were also of the opinion that the working paper was lacking examples from Canadian waters and that an effort should be made to focus the text on this literature, rather than examples from outside Canadian waters (e.g. coldwater corals and sponges rather than tropical reef systems).

Participants were also concerned that the level of detail included in the paper was not sufficient in order for it to be readily used by risk assessment practitioners. Mr. Greig clarified that the PoEs provided are independent of space and time in order to make them as general as possible; should a risk assessment be conducted, these concepts would need to be considered. Mr. Greig reiterated that the primary intent of these PoEs was to be a communication tool for engaging stakeholders and a general starting point for risk assessments.

There was substantial discussion regarding whether the PoEs should include specific endpoints. Many participants felt strongly that the POEs should include endpoints (e.g. species, habitat types, community and ecosystem properties) to make them as comprehensive as possible and to increase their usefulness to risk practitioners. The idea of a matrix which included endpoints on one axis and shipping activities on the other was discussed at length. In the end, consensus could not be reached regarding the inclusion of this matrix in the Science Advisory Report. Lack of consensus was not necessarily related to the concept of the matrix, but that producing it in the limited time available at the meeting was not ideal. Participants noted that this kind of information would certainly be required to conduct a risk assessment, but that it could be

collected and analysed on an area-specific basis (rather than including it in this general, national advice).

Participants agreed that consistency in the terminology used was very important for the science advisory document and also the working paper. Participants suggested the inclusion of a glossary in the working paper to ensure consistent understanding of the terminology used.

Participants made various suggestions for each of the PoE diagrams with respect to linkages between the activities and potential impacts. The general PoE model that includes each of the shipping activities considered (i.e. movement underway, discharge, oil spills, anchoring, and grounding) is provided in the Science Advisory Report associated with this peer review process;

CONCLUSIONS

The Science Advisory Report from this peer review meeting includes general guidance on the linkages between shipping and its potential impact on aquatic environments which can inform area or region-specific risk assessments, and also serves as a communication tool to engage interested stakeholders.

A working paper in the form of a literature review was produced for the meeting. There was considerable discussion regarding the working paper and a substantial number of revisions were requested in order for the working paper to be published as a Research Document. Upon review of the final draft of the working paper, it was determined that the requested revisions were not sufficiently addressed. Therefore, the working paper will not be published as a Research Document and will not be referenced in the Science Advisory Report provided at this meeting. Although the working paper will not be published as a Research Document, it was considered when drafting the Science Advisory Report, along with the expert opinions of the participants of the meeting.

APPENDIX I. LIST OF PARTICIPANTS

Participant	Affiliation
Lougheed, Cecilia (Co-Chair)	Fisheries & Oceans Canada; National Capital Region
Stoneman, Mike (Co-Chair)	Fisheries & Oceans Canada; National Capital Region
Bailey, Sarah	Fisheries & Oceans Canada; Central & Arctic Region
Barchard, Wayne	Environment Canada
Brown, Leah	Fisheries & Oceans Canada; Central & Arctic Region
Danielson, Heather	Fisheries & Oceans Canada; National Capital Region
Ewins, Pete	World Wildlife Fund
Gaston, Tony	Environment Canada
Giangioppi, Martine	Fisheries & Oceans Canada; National Capital Region
Gilchrist, Grant	Environment Canada
Gravel, Caroline	Shipping Federation of Canada
Greig, Lorne	ESSA
Katsumi, Naomi	Transport Canada
Lawson, Jack	Fisheries & Oceans Canada; Newfoundland & Labrador Region
Lesage, Véronique	Fisheries & Oceans Canada; Quebec Region
McQuinn, Ian	Fisheries & Oceans Canada; Quebec Region
Topping, Paul	Transport Canada
O, Miriam	Fisheries & Oceans Canada; Pacific Region
Payne, Jerry	Fisheries & Oceans Canada; Newfoundland & Labrador Region
Sadar, Kamuran	Environment Canada
Schimnowski, Oksana	Fisheries & Oceans Canada; Central & Arctic Region
Simard, Yvan	Fisheries & Oceans Canada; Quebec Region
Taggart, Chris	Dalhousie University
Vagle, Svein	Fisheries & Oceans Canada; Pacific Region
Walker, Sherry	Fisheries & Oceans Canada; National Capital Region
White, Andrea	Fisheries & Oceans Canada; National Capital Region

APPENDIX II. TERMS OF REFERENCE

Science Advice for Pathways of Effects for Shipping

National Peer Review - National Capital Region

October 1-3, 2013
Ottawa, ON

Co-Chairpersons: Mike Stoneman and Cecilia Lougheed

Context

As the department moves towards an ecosystem approach, the development and implementation of standards and codes of practice are becoming increasingly important. The development of pathways of effects (PoEs) has been identified as a first step in the process for identifying the stressors that will have the greatest impact on ecological components, and whether there are any gaps in our knowledge base.

The PoEs will help assist with risk prediction and estimation of potential impacts, engage with stakeholders who have an interest in marine shipping, inform government decision-makers and industry to assist in ocean planning exercises and environmental assessments, and provide greater direction on where to focus potential mitigation measures. In addition, the PoEs can be used as a tool to conduct more specific risk assessments for valued ecosystem components. Scientific advice on the PoEs is required before any kind of detailed threat assessment can be conducted. The scope for this process will include the review of the resulting effects on habitat, species and communities from pressures such as oil spills, noise, strikes, ice breaking, anchorage, grounding, discharge, aerial contamination and deposition, and water contamination. This process will not include dredging or building infrastructure as these issues are covered by other programs.

Objectives

What are the major pathways between marine shipping activities, the pressures they generate and their potential ecological impacts?

This national peer review process will be based on Pathways of Effects (PoE) models, where the following areas would be validated and assessed by experts:

1. Identification/validation of each known pathway;
2. Description of the state of knowledge with respect to each stressor-effect linkage; and
3. Identification of areas of uncertainty and knowledge gaps respecting the stressor-effect linkages.

A working paper will be reviewed that presents a diagram of the pathways of effects for marine shipping. The working paper will include analysis of each pathway stressor-effect linkages along with relevant supporting literature.

Expected Publications

- Science Advisory Report
- Proceedings
- Research Document

Participation

- Fisheries and Oceans Canada (Ecosystems and Oceans Science, Oceans Policy and Planning)
- Other Government Departments (Transport Canada, Environment Canada)
- Academia
- ENGO
- Industry (shipping industry)
- Other invited experts